

Simplify

$$\textcircled{1} (x-y)(x+y) = x^2 - y^2$$

$$\textcircled{2} (x-y)(x^2 + xy + y^2) = x^3 - y^3$$

$$\textcircled{3} (x-y)(x^3 + x^2y + xy^2 + y^3) = x^4 - y^4$$

$$\lim_{x \rightarrow c} \frac{f(x) - f(c)}{x - c}$$

$$f(x) = x^4$$

$$f'(x) = 4x^3$$

$$\lim_{x \rightarrow c} \frac{x^5 - c^5}{x - c} \Rightarrow \lim_{x \rightarrow c} \frac{\cancel{(x-c)}(x^4 + x^3c + x^2c^2 + xc^3 + c^4)}{\cancel{(x-c)}}$$

$$\lim_{x \rightarrow c} x^4 + x^4 + x^4 + x^4 + x^4 = 5x^4$$

$$f(x) = x^n$$

$$f'(x) = nx^{n-1}$$

$$f(x) = g(x) \cdot h(x)$$

$$f(x) = x^7 \cdot x^{11}$$

$$f(x) = x^{18}$$

$$f'(x) = 18x^{17}$$

$$g'(x) = 7x^6$$

$$h'(x) = 11x^{10}$$

$$f(x) = x^2 \sin x$$

$$f'(x) = (n+m)x^{(n+m-1)}$$

n = power in $g(x)$

m = power in $h(x)$

$$(7+11)x^{(7+11-1)}$$

$$18x^{17}$$

$$f'(x) = g'(x)h(x) + h'(x)g(x)$$

$$7x^6 x^{11} + 11x^{10} x^7$$

$$7x^{17} + 11x^{17}$$

$$18x^{17}$$

$$y = 7x^3 \Rightarrow 7 \cdot \frac{dy}{dx}(x^3)$$

$$7 \cdot 3x^2 = 21x^2$$

$$3x^3 + 4x^2 + 7$$

$$9x^2 + 8x + 0$$

$$f(x) = g(x) \cdot h(x)$$

$$f'(x) = g(x) h'(x) + h(x) g'(x) \quad \text{or}$$

$$f'(x) = h(x) g'(x) + g(x) h'(x)$$

lo di hi mitra hi di lo oha lo lo

$$f(x) = \frac{u}{v}$$

$$f'(x) = \frac{v \frac{du}{dx} - u \frac{dv}{dx}}{v \cdot v}$$

v^2

Neg. power

$$x^{-3}$$

$$-3x^{-4}$$

$$\frac{1}{x^2} \Rightarrow x^{-2}$$

Homework

- learn derivative rules
- Sect. 3.3 #3-39 (mult. of 3), 44, 45, 46, 47, 51